

Docket No.: L4050.0002
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Jingnan Huang, et al.

Application No.: 10/527,327

Confirmation No.: 3523

Filed: October 27, 2005

Art Unit: 2157

For: THE METHOD OF SEARCHING FOR
DEVICES AUTOMATICALLY IN A
NETWORK

Examiner: Hee Soo Kim

DECLARATION OF INVENTOR UNDER 37 C.F.R. § 1.131

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

I, Jingnan Huang, do hereby declare and state as follows:

1. I am one of the co-inventors of the above-identified U.S. patent application ("the subject application").

2. The subject application was filed as International Patent Application PCT/CN2003/000524 on July 2, 2003, which claims priority to Chinese Patent Application 02130660.5 filed September 16, 2002 ("Chinese priority application") and which entered into the U.S. national stage on October 27, 2005, as is evidenced by the attached executed Declaration (Exhibit A).

3. I have reviewed and understand the subject application, including the currently pending claims with any and all amendments (the "Claimed Invention").

4. We conceived the invention covered by the Claimed Invention prior to August 19, 2002, as is evidenced by the attached Exhibit B, which is a written document prepared by myself describing the Claimed Invention (the "Invention Record"). An English-language translation of selected portions in the Invention Record is also provided as part of Exhibit B. The actual date on

the Invention Record and any description not relevant to the conception of the Claimed Invention have been redacted. Nevertheless, the actual date of this Invention Record predates August 19, 2002. Therefore, the Invention Record establishes at least the conception of the Claimed Invention prior to August 19, 2002.

5. On August 5, 2002, Mr. Yujin Luo, a co-inventor and patent liaison, forwarded the Invention Record to Mr. Shan Jiang, the team leader of the research project, who then forwarded the Invention Record to Mr. Yefei Dong, patent counsel of Lenovo (Beijing) Limited, who subsequently forwarded the Invention Record to Ms. Qi Wang of the law firm Deqi in Beijing, China for preparation of the Chinese priority application. The above activities are evidenced by the attached Exhibit C, which is a copy of email correspondences between the above individuals concerning the preparation of the Chinese priority application.

6. The inventors then worked with the law firm Deqi to prepare and finalize the draft application as is evidenced by the attached Exhibit D, which is a copy of the September 12, 2002 email from Lenevo's in-house patent counsel to the law firm Deqi concerning the preparation of the Chinese priority application, before it is filed on September 16, 2002.

7. The preparation of the Chinese priority application covering the Claimed Invention was thus diligently pursued from prior to August 19, 2002 to the filing of the Chinese priority application on September 16, 2002.

8. The attached Exhibits are photocopies of original drawings, records, and other original evidence of the conception and reduction to practice of the Claimed Invention.

All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the above-identified patent.

Date: 2008-2-19

By: 

Jingnan Huang

EXHIBIT A

UNITED STATES OF AMERICA COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION		FILE NO. L4050.0002 FP05005US																													
<p>As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p> <p style="text-align: center;"><u>THE METHOD FOR CONNECTING DEVICES IN DYNAMIC FAMILY NETWORKING</u></p> <p>the specification of which is attached hereto, unless the following box is checked:</p> <p><input checked="" type="checkbox"/> was filed on <u>July 2, 2003</u> as United States patent Application Number or PCT International patent application number <u>PCT/CN2003/000524</u> and was amended on _____ (if any).</p> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose all information known to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.</p> <p>I hereby claim priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate or United States provisional application(s) listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:</p> <p>Prior Foreign or Provisional Application(s)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">COUNTRY</th> <th style="width: 25%;">APPLICATION NUMBER</th> <th style="width: 25%;">DATE OF FILING (day, month, year)</th> <th style="width: 25%;">PRIORITY CLAIMED UNDER 35 U.S.C. § 119</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">China</td> <td style="text-align: center;">02130660.5</td> <td style="text-align: center;">16, September, 2002</td> <td><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</td> </tr> <tr> <td></td> <td></td> <td></td> <td><input type="checkbox"/> YES <input type="checkbox"/> NO</td> </tr> <tr> <td></td> <td></td> <td></td> <td><input type="checkbox"/> YES <input type="checkbox"/> NO</td> </tr> </tbody> </table> <p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;">UNITED STATES APPLICATION NUMBER</th> <th style="width: 35%;">DATE OF FILING (day, month, year)</th> <th style="width: 30%;">STATUS (patented, pending, abandoned)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>I hereby appoint customer no. 32172, DICKSTEIN, SHAPIRO, MORIN & OSHINSKY, LLP, as attorneys with full power of substitution and revocation to prosecute this application, to transact all business in the Patent & Trademark Office connected therewith and to receive all correspondence.</p> <p>SEND CORRESPONDENCE TO: DICKSTEIN, SHAPIRO, MORIN & OSHINSKY, LLP 1177 Avenue of the Americas, 41st Floor New York, NY 10036-2714</p> <p style="text-align: right;">DIRECT TELEPHONE CALLS TO: (212) 835-1400</p> <p>In the event that the filing date and/or Application No. are not entered above at the time I execute this document, and if such information is deemed necessary, I hereby authorize and request my attorneys/agent(s) to insert above the filing date and/or Application No. of said application.</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p>				COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. § 119	China	02130660.5	16, September, 2002	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				<input type="checkbox"/> YES <input type="checkbox"/> NO				<input type="checkbox"/> YES <input type="checkbox"/> NO	UNITED STATES APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)									
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FULL NAME OF SOLE OR FIRST INVENTOR Jingnan HUANG		INVENTOR'S SIGNATURE <i>Jingnan Huang</i>																													
RESIDENCE (City and either State or Foreign Country) Beijing, China		DATE 05.3.04																													
COUNTRY OF CITIZENSHIP China																															
POST OFFICE ADDRESS #6 Chuangye Road, Shangdi Information Industry Base, Haidian District, Beijing, P.R. China 100085																															
FULL NAME OF SECOND JOINT INVENTOR (IF ANY) Yujin LUO		INVENTOR'S SIGNATURE <i>Yujin Luo</i>																													
RESIDENCE (City and either State or Foreign Country) Beijing, China		DATE 05.3.31																													
COUNTRY OF CITIZENSHIP China																															
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			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p>			
FULL NAME OF SEVENTH JOINT INVENTOR, IF ANY Yanpin REN		INVENTOR'S SIGNATURE Yanpin REN	DATE 2005.3.30
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FULL NAME OF TENTH JOINT INVENTOR, IF ANY Shan JIANG		INVENTOR'S SIGNATURE Shan Jiang	DATE 05.3.31
RESIDENCE (City and either State or Foreign Country) Beijing, China		COUNTRY OF CITIZENSHIP China	
POST OFFICE ADDRESS #6 Chuangye Road, Shangdi Information Industry Base, Haidian District, Beijing, P.R. China 100085			

新品专利申请技术交底书

专利名称	家庭网络中设备管理中的设备注册与注销机制		
发明类型	发明专利	填表人	黄景楠
发明人		填表日期	

- 所属技术领域

本发明涉及一种在家庭范围内，用于实现设备统一集中管理的设备注册和设备注销机制。

- 背景技术

随着人们物质生活水平的提高，家庭范围内的信息设备、通讯设备、娱乐设备、家用电器、自动化设备、保安（监控）装置等设备逐渐增多，同时因为个人计算机和因特网在家庭中的迅速普及、电讯技术的蓬勃发展以及智能设备的长足进步，家庭网络日益受到广泛关注，人们对于简单、灵活与可靠的家庭网络的需求也愈显强烈。产生了很多与之相关的词语，例如，智能家居（Smart Home）、电子家庭（Electronic Home, e-Home）、数字家园（Digital Family）、网络家居（Network Home）、智能化家庭（Intelligent Home）。这些词语所涵盖的内容是基本相同的，都是源于家庭网络的概念。具体的讲家庭网络（Home network）包括四层含义：家庭中的信息设备、通讯设备、娱乐设备、家用电器、自动化设备、保安（监控）装置等互联互通、资源共享，组成家庭智能化网络系统；通过网关与社区、互联网连接，实现与家庭外部环境的信息交换；家庭的设备及其连接的网络应该满足人们安全、方便、舒适、健康与绿色环保的基本需求，为人们提供身心愉悦的体验；体现以人为本的理念，易于使用、安全可靠、方便维护、价格适宜，满足居家生活的特点。

- 发明目的

家庭网络的核心思想是设备的互联互通、资源共享。对设备实施统一集中管理更有利于设备之间的资源共享，因此，本发明的目的在于提出一种适用于家庭网络中设备集中管理的设备注册和注销机制。

- 技术方案

1. 设备构成

在本方案中，家庭中的设备由一个资源管理设备和可能的多个信息设备构成。如图-1 所示。其中，资源管理设备由家庭用户指定，在资源管理设备和所有需要管理的设备上添加一个软件，由各设备上的该软件互相通信实现设备的注册和注销功能。

资源管理设备管理家庭网络中的所有设备资源，用户可以通过资源管理设备实现设备的统一集中管理，如设备检索，设备加入控制，设备权限控制等。

家庭中的非资源管理设备可以将自身在资源管理设备上注册，以获取集中控制的某些权限，如检索，访问其他设备上的资源等。

2. 设备注册

设备注册过程发生在一信息设备和资源管理设备之间，信息设备首先必须发现资源管理设备，进而开始设备注册过程。

2. 1 设备发现

设备发现包括两个过程：设备宣告和设备查找。

家庭网络中的设备启动时，其上运行的软件应该根据专利说明书《设备宣告》中的方法向网络中宣告自身的存在信息及相关的的核心需求信息。

通过设备宣告以及专利说明书《设备查找》中的设备查找步骤，家庭网络中的所有设备可以互相发现对方的存在。

2. 2 设备注册

设备注册过程如图-2 所示。设备注册过程由信息设备向资源管理设备发起设备注册请求开始。完整的设备注册过程包括如下 8 个步骤：注册请求发送，注册请求处理，注册响应发送，注册响应处理，注册挑战值发送，注册挑战值处理，注册应答值发送，注册应答处理。

2. 2. 1 注册请求发送过程

由信息设备向资源管理设备发送，开始设备注册过程。信息设备向资源管理设备发送包含如下字段的设备注册请求信息：

字段名	内容	取值范围
消息序列号	协议消息序列号	大于 1 的无符号整数
注册类型	表明该消息为注册或是注销	Register
用户名称	表明该设备的用户信息	长度大于 1 小于 32 的字符串
注册请求序列号	注册过程中的请求序列号	[1,2]

其中，设备的用户名称设置方法参见专利文档《安全机制》。

2. 2. 2 注册请求处理

资源管理设备收到设备的注册请求时，首先判断当前已经注册的设备是否已经到达容许注册的设备数目上限，如果是，则返回注册结果为 OVERLOAD 的注册响应消息，本次设备注册结束，否则判断设备请求中标明的用户信息是否存在，如果不存在，则返回注册结果为 ACCESSDENIED 的注册响应消息，否则，随机生成一段长度为 32 位的挑战值，生成注册挑战值消息发送给注册请求设备，同时保存挑战值准备后续使用。

其中，用户信息的设置判断方法参见专利文档《安全机制》，注册响应消息发送见 2. 2. 7。

2. 2. 3 注册挑战值发送

资源管理设备随机生成一段挑战值发送给发起注册请求的设备，并将挑战值存储等待响应值的到来进行比较。

资源管理设备向发起注册请求的设备发送包含如下字段的挑战值信息：

字段名	内容	取值范围
消息序列号	协议消息序列号	大于 1 的无符号整数
挑战值	挑战字符串	长度为 32 位的字符串

2. 2. 4 挑战值处理

发起注册请求的设备收到挑战值消息后，应检索自身设备是否存在相应的密钥信息，如果不存在，则本次注册过程失败。否则应根据挑战值和密钥生成应答值发送给资源管理设备。应答值的产生方法参见专利文档《安全机制》。

2. 2. 5 应答值发送

发起注册请求的设备在生成应答值后,应向资源管理设备发送包含如下字段的注册应答消息:

字段名	内容	取值范围
消息序列号	协议消息序列号	大于 1 的无符号整数
应答值	应答字符串	长度为 32 位的字符串

2. 2. 6 应答值处理

资源管理设备收到注册请求设备发来的应答值后,应根据原先保存的挑战值以及相应的密钥判断该应答值是否正确,如果正确,则向注册发起设备发送包含注册成功的注册响应消息,否则发送包含密钥错信息的注册响应消息。

其中,密钥的配置及应答值的正确与否判断参见专利文档《安全机制》。

2. 2. 7 注册响应消息发送

资源管理设备根据应答值处理的结果向注册发起设备发送包含如下字段的注册响应消息:

字段名	内容	取值范围
消息序列号	协议消息序列号	大于 1 的无符号整数
注册响应消息序列号	注册响应消息序列	[1,2]
注册结果	应答字符串	SUCCESS 或 OVERLOAD 或 ACCESSDENIED

2. 2. 8 注册响应消息处理

注册请求发起设备收到注册响应消息后,根据注册结果即可判断本次注册是否成功。

3. 设备注销

设备注销包括设备注销请求发送和设备注销请求处理两个步骤。

3. 1 设备注销请求发送

家庭网络中的信息设备在资源管理设备注册成功后,如果因为某种原因要离开家庭网络,应向资源管理设备发送包含如下信息的设备注销请求。

字段名	内容	取值范围
消息序列号	协议消息序列号	大于 1 的无符号整数
注册类型	设备注册类型	Deregister

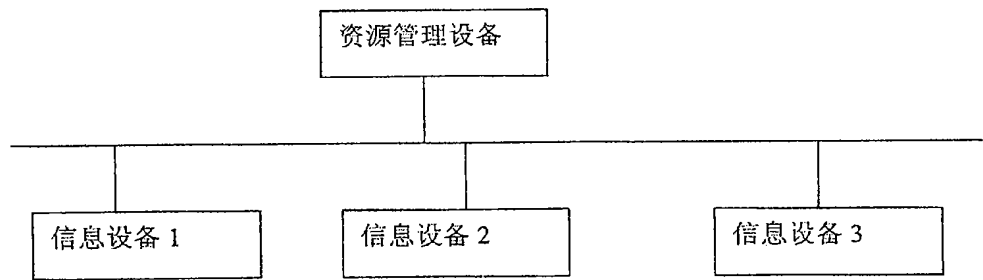
为保证不会出现假冒的设备注销请求,设备注销请求发送应根据专利文档《安全机制》中的加密方法进行传输。

3. 2 设备注销消息处理

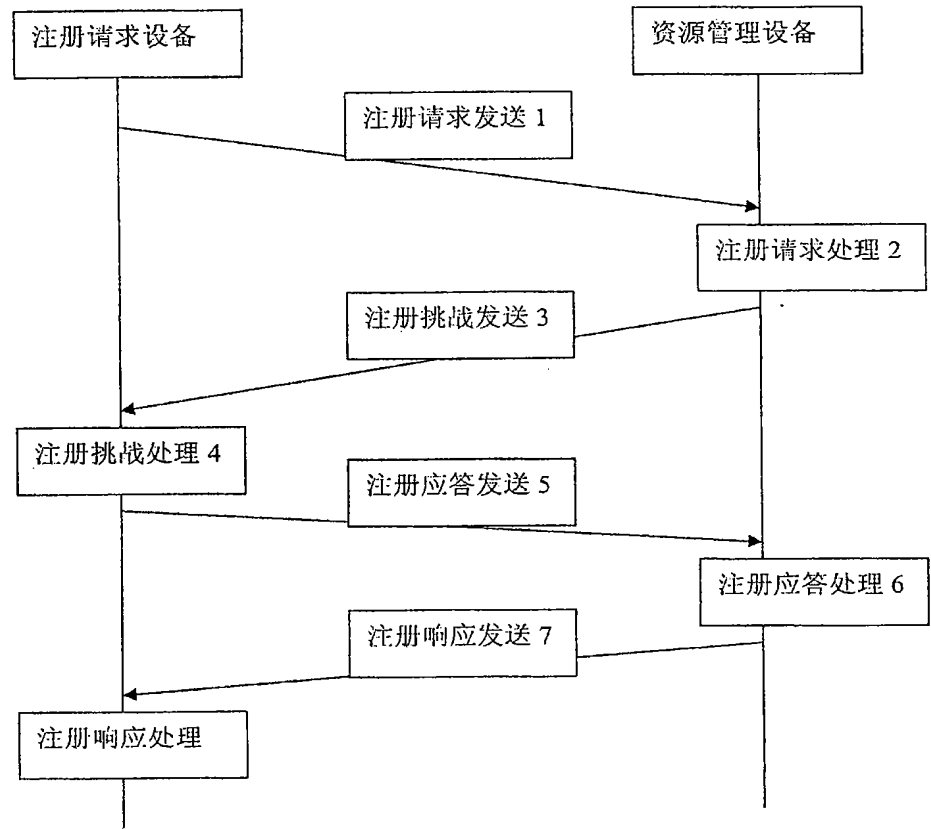
资源管理设备收到设备注销请求后,首先判断该设备是否在本设备上注册过,如果不是,则忽略本次设备注销请求。否则,根据专利文档《安全机制》中的方法校验本消息是否真实,如果是,则删除相关设备信息。

4. 附图

4. 1 图-1 家庭网络设备管理中的设备注册注销设备构成图



4. 2 图-2 设备注册过程图



Technical description for patent application

Title	Peer to peer device connection method in home network		
Invention Type	Invention	author	Huang jingnan
		date	██████████

● The goal of this invention

The goal of home network is to make devices in the network can be connected and share resource to each other. In the case of existing resource management device, devices in the network can be managed by the resource management device which is described in another patent application document "device register and un-register in the home network". But it will not be true that all home networks will have a fixed resource management device. The goal of this invention is to propose a mechanism to implement peer to peer device connection. Based on this kind of device connection, devices can be connected and share resource to each other without the help of centralized resource management device.

● Technical description

1. device involved

Peer to peer connecting including a connection initiate device and a connection target device while the target device is decided by the initiate device. These two devices all need to install software to support peer to peer connection.

2. device connection:

To establish peer to peer connection, initiate device must firstly discover the target device before peer to peer connection process.

2. 1 device discovery

Device discovery includes two phrases: device announcement and device discover.

When the device begins running, the software on the device should announce its existing information and related security requirement according to another patent application document "device announcement method".

With the help of device announcement and device discover method described in another patent document "device discovery method", the devices in the home network can find each other.

2. 2 device connection

Figure 2 describes the device connection process. It includes 8 steps: security

key setting, connection request sending, connection request process, challenge value sending, challenge value process, challenge response sending, connection response sending, connection response process.

2. 2. 1 security key setting

Home network administrator or user should firstly set the security settings according to another patent application document "security mechanism"

2. 2. 2 connection request sending

Connection initiate device sends a device connecting request to a connection target device in the network. Here connecting request should include following information.

Field Name	Content	Value Range
Type of message	connection creating request	a character string (ConnectRequest)
Serial number of message	serial number of protocol message	an unsigned integer more than 1
User name	indicating user's information of the device	a character string whose length is more than 1 and less than 32
Serial number of connection request	request's serial number during the connecting procedure	[1]

2. 2. 3 connection request process

When the connection target device receives the connection request from the connection initiating device, it firstly judges whether the number of connection initiating devices currently connected with the present connection target device has reached the upper limit of the allowed connection number. If so, it returns a connection response message whose connecting result is overload (OVERLOAD) in a subsequent step, and this device connecting procedure is ended. Otherwise, it further judges whether the user information of the connection initiating device is in the present connection target device according to the user information indicated in the device connecting request. If not so, then it returns a connection response message whose connecting result is denial of access (ACCESSDENIED). Otherwise, a challenge value whose length is 32 bits are randomly generated, and based on which, a connection challenge value message is generated in order to be sent to the connection initiating device, and the challenge value is also saved for later

usages (such as waiting for the arrival of a response value so as to make a comparison).

Initiate response message is described in 2.2.8.

2. 2. 4 challenge value sending

The connection target device sends it to the connection initiating device. In this step, the message should include following information:

Field Name	Content	Value Range
Serial number of message	serial number of protocol message	an unsigned integer more than 1
Challenge value	ChallengeValue	a 32 bits long character string

2. 2. 5 challenge value process

After receiving the connection challenge value message, the connection initiating device should retrieve whether there is key information corresponding to the challenge value in the device itself. If there isn't, then the present connection is failed, and the present connecting procedure is ended. Otherwise, a reply value (a response value, Response) should be generated in accordance with the security mechanism according to the challenge value and the key (after receiving the identity authenticating algorithm identifier ID and the challenge value, the connection initiating device encrypts the challenge value with its own key), and is sent to the connection target device.

2. 2. 6 challenge response sending

After challenge response value generating, connection request initiate device should send it back to connection target device. The message should includes following information.

Field Name	Content	Value Range
Serial number of message	serial number of protocol message	an unsigned integer more than 1
response value	Challenge response value	a 32 bits long character string

2. 2. 7 challenge response process

After receiving the challenge response value sent from the connection initiating device, the connection target device should judge whether this reply value is valid according to the saved challenge value and its corresponding key. If it is valid, the connection target device sends a connection response message containing success of connection to the connection initiating device; otherwise, a connection response message containing information about wrong key is sent.

If connection target device consider this connection successfully established, it should add itself current connection number.

Here, how to decide the challenge response value is correct or no is based on the method described in another patent application document " security mechanism"

2. 2. 8 connection response sending

The connection target device sends a connection response message according to the result of challenge response valude processing. The connection response message includes serial number of message, serial number of connection response message and connecting result.

Field Name	Content	Value Range
Serial number of message	serial number of protocol message	an unsigned integer more than 1
Serial number of connection response message	serial number of connection response message	2
Connecting result	reply character string	SUCCESS or OVERLOAD or ACCESSDENIED or AUTHENTICATE

2. 2. 9 connection response process

After receiving the connection response message, the connection initiating device can immediately judge the present connection is successful or not.

3. disconnection

After the connection relation is established between two devices, a connection disconnection can be performed at anytime. The connection disconnection

includes two steps of connection disconnecting request and connection disconnecting request message processing.

3. 1 disconnection request

During the connection disconnecting request, any one of the devices (the initiating connection device or the target connection device) can both initiate a connection disconnecting request to the other device at any time to disconnect the established connection. The sent connection disconnecting request message includes serial number of message and reason for disconnecting connection (normal or protoerror). The names, contents and value ranges of respective fields are as shown in the following table.

Field Name	Content	Value Range
Serial number of message	serial number of protocol message	an unsigned integer more than 1
Reason for disconnecting connection	reasons for disconnecting the connection	NORMAL or PROTOERROR

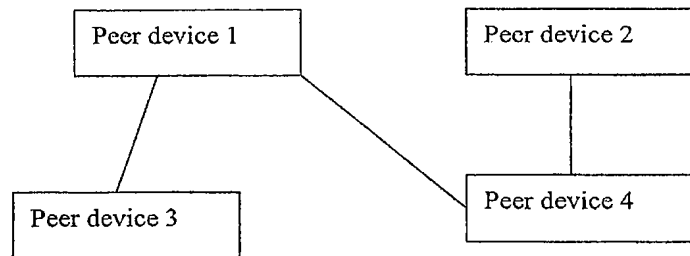
In order to ensure that no fraudulent device connection disconnecting request occurs, the sending of the device connection disconnecting request should be transmitted according to the encrypting method defined in the security mechanism.

3. 2 disconnection process

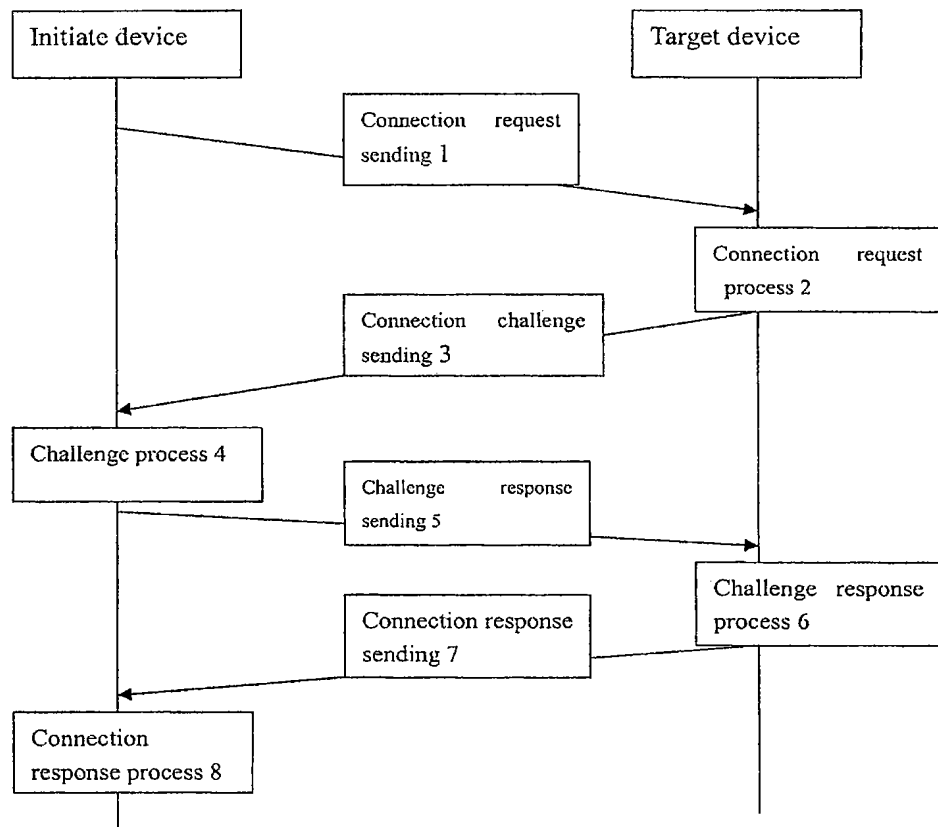
During the connection disconnecting message processing, when any one of the devices with an established connection relation receives the connection disconnecting request from the other device, it regards that the present connection is disconnected, and at the same time, the both devices should decrease the connection numbers thereof

4. Figures

4. 1 figure—1 peer to peer connection devices in home network



4. 2 figure—2 device connection establish process



----- Original Message -----

[REDACTED]

[REDACTED]

2002-08-05 19:17

— CONFIDENTIAL

----- 转发人 dongyf/Legend 时间 2002-08-05 19:15 -----

2002-08-05 18:19

1/25/2008

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2002-08-05 18:11

抄送: 徐燕洁/研究院知识管理交流处/联想, 张德魁/研究院嵌入系统研究室/联想
主题: 重发专利交底书。

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1/25/2008

Gao, Helene

From: wangxym@legend.com on behalf of wangxym@legend.com.cn
Sent: Thursday, September 12, 2002 8:04 AM
To: zlkqy@public.bta.net.cn
Subject: 设备连接专利确认 (TO 王丽琴老师)

王老师，今天下午黄景楠已将"设备连接"的修改意见发给您，不知是否收到？

本案的发明人：黄景楠、罗予晋、张渊毅、刘向东、庄渭峰、张德魁、任艳频、李明、孟闯、姜珊。

[REDACTED]
[REDACTED]

谢谢王老师。

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